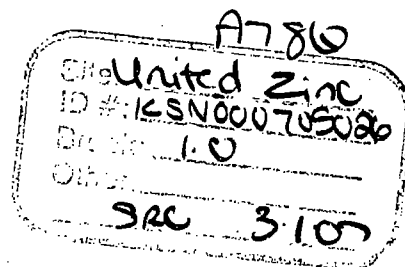




TETRA TECH EM INC.

March 1, 2007

Mr. Roy Crossland  
START Project Officer  
U.S. Environmental Protection Agency, Region 7  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101

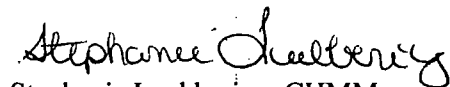


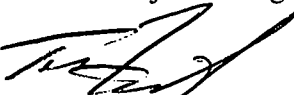
**Subject: Quality Assurance Project Plan  
United Zinc No. 1, Iola, Kansas  
U.S. EPA Region 7, START 3, Contract No. EP-S7-06-01  
Task Order No. 0038.000  
Task Monitor: Paul Roemerman, EPA Site Assessment Team Leader**

Dear Mr. Crossland:

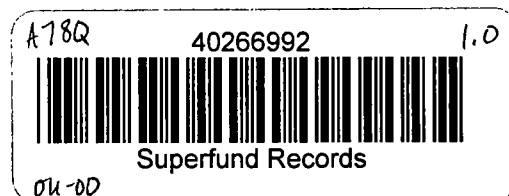
Tetra Tech EM Inc. is submitting the attached Quality Assurance Project Plan for Site Investigation activities at the United Zinc No. 1 site in Iola, Kansas. If you have any questions or comments, please contact me at (913) 495-3920.

Sincerely,

  
Stephanie Luebbering, CHMM  
START Project Manager

  
Ted Faile, PG, CHMM  
START Program Manager

Enclosures



X9004.06.0038.000

8030 Flint Street, Lenexa, KS 66214  
Tel 913.894.2600 Fax 913.894.6295  
www.ttemi.com

**QUALITY ASSURANCE PROJECT PLAN  
FOR SITE INVESTIGATION ACTIVITIES  
UNITED ZINC NO. 1  
IOLA, KANSAS**

**CERCLIS ID: KSN000705026**

**Superfund Technical Assessment and Response Team (START) 3  
Contract No. EP-S7-06-01, Task Order 0038.000**

**Prepared For:**

**U.S. Environmental Protection Agency  
Region 7  
Superfund Division  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101**

**February 28, 2007**

**Prepared By:**

**Tetra Tech EM Inc.  
8030 Flint Street  
Lenexa, Kansas 66214  
913-894-2600**

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### Appendices

#### A     FIGURES

**Region 7 Superfund Program**  
**Addendum to the QAPP for Superfund Integrated Site Assessment and Targeted Brownfields Assessment Activities (July 2005)**  
**for the United Zinc No. 1 Site**

**Project Information:**

|   |   |  |  |
|---|---|--|--|
| <b>Site Name:</b> United Zinc No. 1             |   | <b>City:</b> Iola                                  | <b>State:</b> Kansas   |
| <b>EPA Project Manager:</b> Paul Roerman        |   | <b>START Project Manager:</b> Stephanie Luebbering |  |
| <b>Approved By:</b> <i>Stephanie Luebbering</i> | <b>Title:</b> START Project Manager       | <b>Date:</b> 2/28/07                               | <b>Prepared For:</b> EPA Region 7 Superfund Division               |
| <b>Approved By:</b> <i>[Signature]</i>          | <b>Title:</b> START Program Manager       | <b>Date:</b> 2/27/07                               |  |
| <b>Approved By:</b> <i>Kathleen Jones</i>       | <b>Title:</b> START QA Manager            | <b>Date:</b> 2/28/07                               | <b>Prepared By:</b> Stephanie Luebbering<br><b>Date:</b> 2/27/2007 |
| <b>Approved By:</b> <i>Paul Roerman</i>         | <b>Title:</b> EPA Project Manager         | <b>Date:</b> 3/1/07                                |  |
| <b>Approved By:</b> <i>Diane Harris</i>         | <b>Title:</b> EPA Region 7 QA Coordinator | <b>Date:</b> 03/09/2007                            | <b>Tetra Tech START Project Number:</b> X9004.06.0038.000          |

**1.0 Project Management:**

**1.1 Distribution List**

EPA—Region 7: Paul Roerman, EPA Project Manager  
Diane Harris, EPA Region 7 QA Coordinator

Tetra Tech START: Stephanie Luebbering, Project Manager

**1.2 Project/Task Organization**

Paul Roerman, of the EPA Region 7 Superfund Division, will serve as the EPA project manager for the activities described in this QAPP. Stephanie Luebbering, of Tetra Tech EM Inc. (Tetra Tech), will serve as the START project manager.

**1.3 Problem Definition/Background:**

Description: This site-specific Quality Assurance Project Plan form is prepared as an addendum to the Generic **Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005)**, and contains site-specific data quality objectives for the sampling activities described herein.

☒ Description attached.

☐ Description in referenced report: \_\_\_\_\_  

Title
Date

**1.4 Project/Task Description:**

☐ CERCLA PA
☐ CERCLA SI
☐ Brownfields Assessment  
☒ Other (description attached):
☐ Pre-CERCLIS Site Screening
☐ Removal Assessment

Schedule: Field work is scheduled for March 2007.

☐ Description in referenced report: \_\_\_\_\_  

Title
Date

**1.5 Quality Objectives and Criteria for Measurement Data:**

|                        |   |
|------------------------|---|
| a. Accuracy:           | <input checked="" type="checkbox"/> Identified in attached table. |
| b. Precision:          | <input checked="" type="checkbox"/> Identified in attached table. |
| c. Representativeness: | <input checked="" type="checkbox"/> Identified in attached table. |
| d. Completeness*:      | <input checked="" type="checkbox"/> Identified in attached table. |
| e. Comparability:      | <input checked="" type="checkbox"/> Identified in attached table. |

Other Description:

\*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make site decisions based on any or all of the remaining validated data.

**1.6 Special Training/Certification Requirements:**

☒ OSHA 1910
☒ Special Equipment/Instrument Operator (describe below):  
Monitoring wells will be installed by a subcontractor.
☐ Other (describe below):

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**for the United Zinc No. 1 Site**

**1.7 Documentation and Records:**

- ☒ Field Sheets      ☒ Site Log      ☐ Trip Report      ☒ Site Maps      ☐ Video  
☒ Chain of Custody      ☒ Health and Safety Plan      ☒ Letter Report      ☒ Photos

- ☒ Sample documentation will follow EPA Region 7 SOP 2420.05D.  
☒ Other: Analytical information will be handled according to procedures identified in Table 2.

**2.0 Measurement and Data Acquisition:**

**2.1 Sampling Process Design:**

- ☐ Random Sampling      ☐ Transect Sampling      ☒ Biased/Judgmental Sampling      ☐ Stratified Random Sampling  
☐ Search Sampling      ☐ Systematic Grid      ☐ Systematic Random Sampling      ☒ Definitive Sampling  
☐ Screening w/o Definitive Confirmation      ☐ Screening w/ Definitive Confirmation  
☒ Sample Maps Attached  
☐ Other (Provide rationale behind each sample): See Attachment A for additional sampling information.

The proposed sampling scheme for groundwater from monitoring wells will be biased/judgmental, with definitive laboratory analysis, in accordance with procedures included in the *Guidance for Performing Site Inspections Under CERCLA*, OSWER Directive #9345.1-05, September 1992, and *Removal Program Representative Sampling Guidance, Volume 1: Soil*, OSWER Directive 9360.4-10, November 1991. All samples will be submitted for analysis by the EPA Region 7 laboratory. See Appendix A for additional site-specific information and maps. The proposed number of samples is a balance between cost and coverage, and represents a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical site investigation.

| Sample Summary Location       | Matrix        | # of Samples* | Analysis         |
|-------------------------------|---------------|---------------|------------------|
| Private drinking water wells  | Groundwater   | 5             | Arsenic and lead |
| Surface water intakes         | Surface water | 3             | Arsenic and lead |
| Surface soil                  | Soil          | 5             | Arsenic and lead |
| Off-site surface water bodies | Surface water | 6             | Arsenic and lead |
| Off-site surface water bodies | Sediment      | 6             | Arsenic and lead |

\*NOTE: Background/QC samples are not included with these totals. See Table 1 for a complete sample summary.

**2.2 Sample Methods Requirements:**

| Matrix                                     | Sampling Method  | EPA Region 7 SOP(s) & Methods |
|--|--|-------------------------------|
| Groundwater – Private drinking water wells | Groundwater samples will be collected directly into sample containers from drinking water wells at spigots/faucets closest to the well heads and prior to any treatment. The samples will be collected into appropriate containers after the wells have been purged for a minimum of 5 minutes and field water quality parameters have stabilized. | SOP 4230.10A                  |
| Surface water – Public water intakes       | Surface water samples will be collected directly into sample containers from the surface water intake taps/spigots prior to any treatment. The samples will be collected into appropriate containers after the intakes have been purged for a minimum of 5 minutes and field water quality parameters have stabilized.                             | SOP 4230.10A                  |
| Soil                                       | Surface soil samples will be collected with disposable stainless steel spoons and field-screened with a XRF.   | SOP 4331.2012                 |
| Water – Surface water                      | Surface water samples will be collected directly into appropriate containers from Rock Creek, Elm Creek, and the Neosho River.   | SOP 4230.17A                  |
| Sediment                                   | Sediment samples will be co-located with the surface water samples and will be collected from the top 2 inches of stream sediment using a clean, dedicated, stainless steel spoon in a dedicated container.  | SOP 4230.08A                  |

**2.3 Sample Handling and Custody Requirements:**

- ☒ Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06D.  
☒ COC will be maintained as directed by Region 7 EPA SOP 2420.04C.  
☒ Samples will be accepted according to Region 7 EPA SOP 2420.01E.  
☐ Other (Describe):

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**for the United Zinc No. 1 Site**

**2.4 Analytical Methods Requirements:**

- ☒ Identified in attached table  
☒ Rationale: The requested analyses have been selected based on the historical information on the site and program experience with similar types of sites.  
☐ Other (Describe):

**2.5 Quality Control Requirements:**

- ☐ Not Applicable  
☒ Identified in attached table  
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).  
☒ Field QC Samples: For this investigation, field QC samples will include a field blank prepared with DI water provided by the EPA Region 7 laboratory. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives and to assess contamination potentially introduced during the sampling and laboratory procedure(s). All QC samples will be submitted for the analyses listed in the attached tables. Evaluation of blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results of blank samples will be evaluated on a qualitative basis by the EPA project manager and EPA contractor(s) to determine a general indication of field-introduced and/or lab-introduced contamination. Total method precision is not required for this event; therefore, field duplicates will not be collected.  
☐ Other (Describe):

**2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:**

- ☐ Not Applicable  
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).  
☒ Other (Describe): Testing, inspection, and maintenance of field instruments (GPS unit, water quality meter, etc.) will be performed in accordance with manufacturers' recommendations. Testing, inspection, and maintenance of laboratory equipment will be performed in accordance with the previously referenced SOPs and/or manufacturers' recommendations.

**2.7 Instrument Calibration and Frequency:**

- ☐ Not Applicable  
☒ Inspection/acceptance requirements are in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).  
☒ Calibration of laboratory equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.  
☒ Other (Describe): Calibration of field instruments (water quality meter, etc.) will be performed daily, as described in the manufacturers' recommendations.

**2.8 Inspection/Acceptance Requirements for Supplies and Consumables:**

- ☐ Not Applicable  
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (Updated July 2005).  
☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers*.  
☐ Other (Describe):

**2.9 Data Acquisition Requirements:**

- ☐ Not Applicable  
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).  
☒ Previous data/information pertaining to the site (including other analytical data, reports, photos, maps, etc., which are referenced in this QAPP) have been compiled by EPA and/or its contractor(s) from other sources. Some of that data has not been verified by EPA and/or its contractor(s); however, the information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data/information.  
☐ Other (Describe):

**2.10 Data Management:**

- ☒ All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01E.  
☐ Other (Describe):

**3.0 Assessment and Oversight:**

**3.1 Assessment and Response Actions:**

- ☒ Peer Review                      ☒ Management Review                      ☐ Field Audit                      ☐ Lab Audit  
☒ Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.05C and 2430.12E.  
☐ Other (Describe):

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**for the United Zinc No. 1 Site**

**3.1A Corrective Action:**

- ☒ Corrective actions will be taken at the discretion of the EPA project manager whenever there appear to be problems that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.
- ☐ Other (Describe):

**3.2 Reports to Management:**

- ☐ Audit Report                      ☐ Data Validation Report                      ☐ Project Status Report                      ☐ None Required
- ☒ A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared by START and submitted to the EPA.
- ☒ Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).
- ☐ Other (Describe):

**4.0 Data Validation and Usability:**

**4.1 Data Review, Validation, and Verification Requirements:**

- ☐ Identified in attached table
- ☒ Data review and verification will be performed in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2005).
- ☒ Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.05C and 2430.12E.
- ☐ Other (Describe):

**4.2 Validation and Verification Methods:**

- ☐ Identified in attached table
- ☒ The data will be validated in accordance with Region 7 EPA SOPs 2430.05C and 2430.12E.
- ☒ The EPA project manager will inspect the data to provide a final review. The EPA project manager will review the data, if applicable, for laboratory spikes, laboratory blanks, and the field blank to ensure that they are acceptable. The EPA project manager will also compare the sample descriptions with the field sheets for consistency and will ensure that any anomalies in the data are appropriately documented.
- ☐ Other (Describe):

**4.3 Reconciliation with User Requirements:**

- ☐ Identified in attached table
- ☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling or re-analysis of the subject samples may be required by the EPA project manager.
- ☐ Other (Describe):

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**Addendum to the QAPP for Superfund Integrated Site Assessment and Targeted Brownfields Assessment Activities (July 2005)**  
**for the United Zinc No. 1 Site**

**Table 1: Sample Summary**

| <b>Site Name:</b> United Zinc No. 1                |  |   |   | <b>Location:</b> Iola, Kansas           |                           |                                |                              |
|--|--|---|---|---|---------------------------|--------------------------------|------------------------------|
| <b>START Project Manager:</b> Stephanie Luebbering |  |   |   | <b>Activity/ASR #:</b> To be determined |                           | <b>Date:</b> February 27, 2007 |                              |
| <b>No. of Samples</b>                              | <b>Matrix</b>                            | <b>Location</b>                                     | <b>Purpose</b>  | <b>Depth or other Descriptor</b>        | <b>Requested Analysis</b> | <b>Sampling Method</b>         | <b>Analytical Method/SOP</b> |
| 5  | Groundwater                              | Private drinking water wells                        | To assess potential groundwater contamination from site operations                                | Unknown                                 | Arsenic and lead          | EPA SOP 4230.10A               | EPA Method 6020              |
| 3  | Drinking water from surface water source | Spigot from surface water intakes                   | To assess potential surface water (drinking water) contamination from site operations             | Unknown                                 | Arsenic and lead          | EPA SOP 4230.10A               | EPA Method 6020              |
| 5  | Surface water                            | Surface water bodies near the site                  | To assess potential surface water contamination from site operations                              | N/A                                     | Arsenic and lead          | EPA SOP 4230.17A               | EPA SOP 3122.03B             |
| 5  | Sediment                                 | Collocated with surface water samples               | To assess potential sediment contamination from site operations                                   | 0-6 inches                              | Arsenic and lead          | EPA SOP 4230.08A               | EPA SOP 3122.03B             |
| <b>Background Samples</b>                          |  |   |   |   |                           |                                |                              |
| 1  | Groundwater                              | Private drinking well upgradient of the site        | To determine background level of contaminants of concern in groundwater                           | Unknown                                 | Arsenic and lead          | EPA SOP 4230.10A               | EPA Method 6020              |
| 1  | Drinking water from surface water source | Spigot from surface water intake upgradient of site | To determine background level of contaminants of concern in surface water (drinking water source) | Unknown                                 | Arsenic and lead          | EPA SOP 4230.10A               | EPA Method 6020              |
| 5  | Soil                                     | Surface soil samples upgradient of the site         | To determine background level of contaminants of concern in surface soil                          | 0-2 inches                              | Arsenic and lead          | EPA SOP 4231.2012              | EPA SOP 3122.03B             |
| 1  | Surface water                            | Surface water sample upgradient of the site         | To determine background level of contaminants of concern in surface water                         | N/A                                     | Arsenic and lead          | EPA SOP 4230.17A               | EPA SOP 3122.03B             |
| 1  | Sediment                                 | Co-located with surface water sample                | To determine background level of contaminants of concern in sediment                              | 0-6 inches                              | Arsenic and lead          | EPA SOP 4230.08A               | EPA SOP 3122.03B             |

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**for the United Zinc No. 1 Site**

**Table 1: Sample Summary (continued)**

| <b>Site Name:</b> United Zinc No. 1                |               |                 |   | <b>Location:</b> Iola, Kansas           |                           |                                |                              |
|--|---------------|-----------------|---|---|---------------------------|--------------------------------|------------------------------|
| <b>START Project Manager:</b> Stephanie Luebbering |               |                 |   | <b>Activity/ASR #:</b> To be determined |                           | <b>Date:</b> February 27, 2007 |                              |
| <b>No. of Samples</b>                              | <b>Matrix</b> | <b>Location</b> | <b>Purpose</b>                                      | <b>Depth or other Descriptor</b>        | <b>Requested Analysis</b> | <b>Sampling Method</b>         | <b>Analytical Method/SOP</b> |
| <b>QC Samples</b>                                  |               |                 |   |   |                           |                                |                              |
| 1  | Water         | Field blank     | To assess field/laboratory-introduced contamination | N/A                                     | Arsenic and lead          | N/A                            | EPA Method 6020              |

**Region 7 Superfund Program**  
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**for the United Zinc No. 1 Site**

**Table 2: Data Quality Objective Summary**

|   |                   |                           |                       |  |   |  |                               |                                |  |
|---|-------------------|---------------------------|-----------------------|--|---|--|-------------------------------|--------------------------------|--|
| Site Name: United Zinc No. 1                |                   |                           |                       | Location: Iola, Kansas   |   |  |                               |                                |  |
| START Project Manager: Stephanie Luebbering |                   |                           |                       | Activity/ASR #: To be determined   |   |  |                               | Date: February 27, 2007        |  |
| Analysis                                    | Analytical Method | Data Quality Measurements |                       |  |   |  | Sample Handling Procedures    | Data Management Procedures     |  |
|   |                   | Accuracy                  | Precision             | Representativeness   | Completeness  | Comparability  |                               |                                |  |
| WATER<br>(Groundwater and Surface Water)    |                   |                           |                       |  |   |  |                               |                                |  |
| Arsenic and lead                            | see Table 1       | per analytical method     | per analytical method | biased/judgmental sampling based on professional judgment of the sampling team | 100%; samples from private drinking water wells and surface water intakes are considered critical samples | Standardized procedures for sample collection and analysis will be used. | See Section 2.3 of QAPP form. | See Section 2.10 of QAPP form. |  |
| SOIL/SEDIMENT                               |                   |                           |                       |  |   |  |                               |                                |  |
| Arsenic and lead                            | see Table 1       | per analytical method     | per analytical method | biased/judgmental sampling based on professional judgment of the sampling team | 100%; Soil samples from surface soil sample locations are critical samples.                               | Standardized procedures for sample collection and analysis will be used. | See Section 2.3 of QAPP form. | See Section 2.10 of QAPP form. |  |

## **APPENDIX A**

### **SITE-SPECIFIC INFORMATION FOR A SITE INVESTIGATION AT THE UNITED ZINC NO. 1**

## **INTRODUCTION**

The Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has been tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct additional Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site Investigation (SI) activities at the United Zinc No. 1 site in Iola, Allen County, Kansas.

The purpose of these activities is to determine whether any threats to human health or the environment exist as a result of releases to soil, groundwater, and surface water. This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

## **SITE LOCATION/DESCRIPTION**

United Zinc is located within the city boundaries of Iola, Allen County, Kansas, on the north side of Highway 54 along Kansas Drive, and is the location of the former United Zinc and Chemical Company Zinc and Lead Smelter. The facility is located on the east side of Iola within a mixture of residential and commercial properties. United Zinc is located in Sections 25 and 36 of Township 24 South, Range 18 East (Kansas Department of Health and Environment [KDHE] 2005), as depicted on the U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map of Iola, Kansas (USGS 1984). The approximate geographic coordinates for the central portion of the facility are 37.9222800 degrees north latitude and 95.385900 degrees west longitude (Maxim Technologies, Inc. [Maxim] 2003). The location of the facility is shown in Appendix A, Figure 1.

The former United Zinc smelter facility was comprised of 10 parcels of land, equivalent to approximately 17 acres, but the overall site area evaluated includes a much larger surrounding section. The property has been graded, leveled, and developed since the former smelter operations ceased in the 1920s (Maxim 2003). Most of the property where the former smelter was located is vacant but includes the following businesses: Brenntag Southwest, Inc. (Chemical Distribution Company), a MFA Distributor, the Superflea Flea Market, Tucker's Flea Market, a portion of a concrete mixing facility, and some pastureland (Maxim 2003, KDHE 2005). The facility is bordered on the north by residential properties; on the east by the East Iola Site (the location of the former Prime Western Smelting Company Works No. 3 and J.B. Kirk Gas and Smelting Company), a car wash, a former Tyson processing facility, and a movie theater; on the south by a restaurant, a dry cleaner, a car dealership, and agricultural land; and on the west by the Colberly Site (the location of the former United Iron Works Company), a truck repair facility, and



the remaining portion of the concrete mixing facility (Maxim 2003). The facility is also surrounded by residential neighborhoods and six schools (KDHE 2005). Investigations have focused specifically on the Iola Preschool for the Exceptional (Iola Preschool) is located northeast of United Zinc, and the McKinley Elementary School (McKinley School) located southwest of United Zinc (Terranext 2005). The facility layout is shown in Appendix A, Figure 2.

According to the historic plat maps and Sanborn fire insurance maps, activities at the United Zinc facility began as early as 1901. At that time, the facility was called the Standard Acid Company and included three furnaces, 12 retorts, and a pottery room with kilns. Mr. William Lanyon owned the property between 1901 and 1902. The property was transferred to United Zinc in 1902. United Zinc and Chemical Company owned and operated the primary zinc smelter until approximately 1912. No known active smelting facilities were documented on the property after 1912. Historical documentation indicates that the United Zinc facility contained four furnaces, eight kilns, 14 retorts, and several ore crushers and roasters (KDHE 2005). The United Zinc facility was designed to capture the sulfur dioxide fumes generated during roasting the ore to make sulfuric acid; therefore, United Zinc likely used the acid chambers associated with the Standard Acid facility (KDHE 2006).

During a 2003 Phase I site reconnaissance, smelter waste was observed at United Zinc, and the quantity was estimated as approximately 1,800 cubic yards concentrated in the southwest corner of the vacant property at United Zinc (Burns & McDonnell Engineering Company Inc. [Burns & McDonnell] 2004, Terranext 2005). Zinc smelter waste is known to contain elevated concentrations of heavy metals from smelting activities—including arsenic, cadmium, lead, and zinc. Sampling of the soil, groundwater, sediment, surface water, smelter waste, and surrounding areas began in 2004 to determine the potential impact from the former smelting operations at United Zinc.

The EPA has tasked Tetra Tech to perform additional sampling as part of the SI to determine background concentrations of arsenic and lead in the surface soil, and to identify impacts to the groundwater and surface water pathways. Investigations to identify the levels of arsenic and lead in residential yards near the former United Zinc facility are continuing under the SI, but background concentrations in the area have yet to be defined. The additional sampling will include surface soil east of the United Zinc facility in an area without existing industrial and commercial facilities. In addition existing private drinking water wells, surface water intakes that provide drinking water to the City of Iola, and surface water and sediment samples from Rock Creek and Elm Creek will also be collected to evaluate the surface water pathway.

## **ENVIRONMENTAL SETTING**

Iola is located within the Upper Neosho Watershed. The City of Iola obtains their drinking water from surface water according to the EPA's Safe Drinking Water Information System. No drinking water violations have been reported for the City of Iola since October 2005. Violations noted since 1992 included exceedences of total haloacetic acids, total trihalomethanes, and total coliform. The City of Iola responded to each health based violation and compliance was achieved (EPA 2007).

Allen County is located within the Osage Plains, and the land is predominantly level with few outstanding differences in the relief of the land. The U.S. Department of Agriculture (USDA) has classified soil in the area as Kenoma silt loam. The Kenoma soil type is described by the USDA as deep, moderately well-drained, very slowly permeable soils on the uplands. These soils are formed in material weathered from sediments high in content of silt and clay (USDA 1978).

## **PREVIOUS INVESTIGATIONS**

Previous investigations at the United Zinc facility are as follows:

- A Phase I Focused Former Smelter Assessment (FFSA) was completed on behalf of the KDHE State Water Plan (SWP) program in December 2003. The FFSA identified a Recognized Environmental Condition (REC) at United Zinc based on observation of smelter waste during the site reconnaissance. The smelter waste appeared to have impacted the vegetative growth in the area of the former smelter operations. In addition, elevated concentrations of lead had been previously documented in the surface soils on the property immediately adjacent to United Zinc from other documented smelting operations, including the East Iola Site and the Colberly Site. A Phase II Assessment was recommended at United Zinc and in the area surrounding the smelting activities to investigate the potential risk of human exposure to heavy metal-impacted waste and surface soil (Maxim 2003).
- Sampling of the soil, smelter waste, groundwater, surface water, and sediment was conducted during the Phase II FFSA at United Zinc in December 2004 on behalf of the KDHE SWP. The sampling identified elevated levels of arsenic, cadmium, lead, and zinc above the background soil sample concentrations. The Phase II FFSA also indicated

potential contamination near residents and at both the McKinley School and the Iola Preschool (Burns & McDonnell 2004, KDHE 2005).

- KDHE collected samples in June 2005 from 50 residential yards located between United Zinc and the McKinley School and the Iola Preschool. Arsenic was detected above its KDHE Risk-Based Standards for Kansas (RSK) Residential Soil Pathway level of 11 milligrams per kilogram (mg/kg) in 18 of the residential samples (Terranext 2005, KDHE 2003). In addition, lead was found above its KDHE RSK Residential Soil Pathway level of 800 mg/kg in 12 of the residential samples, some of the same samples with elevated arsenic concentrations. Cadmium and zinc were detected in all of the soil samples at concentrations below their KDHE RSK Residential Soil Pathway values (Terranext 2005, KDHE 2003, 2005).
- A Preliminary Removal Site Evaluation (RSE) was conducted by KDHE in September 2005. In support of the 2005 RSE, KDHE collected additional samples from sensitive receptors areas near United Zinc, including the McKinley School and Iola Preschool. The results exhibited elevated levels of arsenic, cadmium, lead, and zinc at residential and non-residential properties. The presence of lead above 400 mg/kg was also identified within the McKinley School playground and adjacent areas. The Preliminary RSE recommended further removal site evaluation and removal action consideration (KDHE 2005).
- Tetra Tech START, under contract to the EPA, prepared a RSE report in September 2006. The sampling activities for the RSE were conducted during April and May 2006. During the RSE, approximately 260 properties were screened for lead using a XRF, and approximately 10 percent of the screened samples were submitted for laboratory confirmation analyses of arsenic, barium, cadmium, lead, and zinc. Thirty-four properties were identified where XRF and/or laboratory data indicated lead concentrations warranted a time-critical removal action (400 mg/kg for schools and daycares; 800 mg/kg for residential properties; and 1,000 mg/kg for commercial properties). The 34 properties included 19 private residences, 10 daycare facilities, two elementary schools, and three commercial properties (Tetra Tech 2006). In addition, 65 residential samples collected during the RSE contained concentrations of lead between 400 mg/kg and 800 mg/kg.

Contaminants potentially released at the site include the following:

- **Metals** – according to historical documents of the zinc smelting industry, smelting operations were known to generate large amounts of soot from burning coal, which was generally contaminated with elevated levels of lead, cadmium, arsenic, and zinc. In addition, the smelting operations generated large volumes of smelter waste, including impure smelting slag and slag blown from the retorts at the end of the smelting process that also contained heavy metals.

## **SAMPLING STRATEGY AND METHODOLOGY**

The sampling activities are tentatively scheduled to begin in March 2007, and will require approximately three days to complete. The laboratory data obtained for all samples collected during this project will be compared to all applicable or relevant and appropriate requirements (ARAR) to assess whether further response is warranted.

### **Groundwater Sampling**

Groundwater samples will be collected from five private drinking water wells (including one background location) (see Appendix B, Figure 3). At this time, Tetra Tech START has not received permission to sample all the wells; however, the intention is to gain permission and to sample these wells. Groundwater samples from the drinking water wells will be collected from taps/spigots located nearest the well heads, prior to any treatment systems. The system lines at active wells will be purged for approximately 5 minutes before the samples are collected. Any wells not currently in use will be purged for at least 15 minutes prior to sampling. Water quality parameters (pH, conductivity, and temperature) will be recorded as each well is purged until the parameters stabilize.

A field sheet will be completed for each groundwater sample location. The field sheets will include the following information: water quality parameters, purge times or estimated purge volumes, property ownership information, exact sample locations (depths and GPS coordinates), and analyses to be performed. The groundwater samples will be submitted to the EPA Region 7 laboratory for analyses of arsenic and lead. Water samples for metals analysis will be collected in 1-liter containers and preserved with nitric acid ( $\text{HNO}_3$ ) to a pH <2. All water samples will be stored in coolers maintained at or below 4 C pending submittal to the EPA Region 7 laboratory.

## **Surface Water Sampling**

Surface water samples will be collected from three surface water intakes used by the City of Iola to provide drinking water to the City (including one background location) (see Appendix B, Figure 3). At this time, Tetra Tech START has not received permission to sample the surface water intakes; however, the intention is to gain permission and to sample these intakes. Surface water samples from the water supply intakes will be collected from taps/spigots located nearest the intake, prior to any treatment systems. The system lines at active wells will be purged for approximately 5 minutes before the samples are collected. Water quality parameters (pH, conductivity, and temperature) will be recorded as each well is purged until the parameters stabilize.

A field sheet will be completed for each surface water sample location. The field sheets will include the following information: water quality parameters, purge times or estimated purge volumes, property ownership information, exact sample locations (depths and GPS coordinates), and analyses to be performed. The surface water samples will be submitted to the EPA Region 7 laboratory for analyses of arsenic and lead. Water samples for metals analysis will be collected in 1-liter containers and preserved with nitric acid ( $\text{HNO}_3$ ) to a pH <2. All water samples will be stored in coolers maintained at or below 4 C pending submittal to the EPA Region 7 laboratory.

## **Soil Sampling**

Surface soil samples will be collected and screened in the field at approximately five residential properties to determine the background concentrations of arsenic and lead in Iola in an area east of the former United Zinc facility. At each property, after receiving consent from the owner, Tetra Tech START will divide the property into distinct cells for screening purposes. While the maximum size of a cell will be 100 by 100 feet, the actual size of cells will be determined in the field based on site features. A cell will extend from the circumference defined by the drip zone around the building or house in all directions 100 feet or to the property line, whichever distance is shorter. Additional areas or cells to be screened include: the drip zone; fine-grained material if used for driveways, sidewalks, or under carports; vegetable gardens; and children's play areas at least 25 by 25 feet. A composite sample consisting of nine aliquots, each collected from 0 to 2 inches below ground surface (bgs), will be collected in each cell and placed in a labeled, sealed plastic bag.

Three separate readings for the metals of interest will be taken of each homogenized sample using a field portable x-ray fluorescence (XRF) analyzer; these readings will be recorded in the appropriate cell on the

field sheet for that property. The average of these three readings will be calculated and also recorded on the field sheet. All of the screened samples will be collected in an 8-ounce jar and will be submitted for laboratory confirmation analyses of arsenic and lead. All soil samples will be stored in coolers maintained at or below 4° C pending submittal to the EPA Region 7 laboratory.

### **Surface Water and Sediment Sampling**

Runoff from the former United Zinc facility drains to the east to Rock Creek. Rock Creek flows to the south and drains into Elm Creek which leads to the confluence of the Neosho River. Two drinking water intakes exist 8 miles downstream of United Zinc, on the Neosho River. Surface water and sediment samples will be collected from Rock Creek, and Elm Creek, as shown in Figure 3 in Appendix B. A background surface water and sediment sample will be collected from Rock Creek upgradient of the former United Zinc facility. At each location, the surface water sample will be collected prior to the collection of the sediment sample. Water samples will be collected by immersing the sample containers directly into the water, whenever possible. All sampling procedures will follow the guidelines established in the EPA Standard Operating Procedures (SOP) identified in the QAPP.

Surface water samples will be submitted to the EPA Region 7 laboratory for analysis of arsenic and lead. Water samples to be analyzed for total metals will be collected in 1-liter containers and preserved with HNO<sub>3</sub> to a pH <2.

Sediment samples will be collected from the top 6 inches of stream sediment with a disposable stainless-steel spoon. The sediment will be placed in a disposable aluminum pie pan for homogenization and then transferred to an 8-ounce jar for analysis of the metals.

Pertinent data, including analyses to be performed and sample location data, will be recorded on field sheets for each sample. All surface water and sediment samples will be stored in coolers maintained at or below 4°C pending submittal to the EPA Region 7 laboratory.

A summary of all anticipated samples for this project is in Table 1 of the attached QAPP form. A summary of data quality objective summaries for this project is in Table 2 of the attached QAPP form. The SOPs and chain-of-custody procedures referenced in the QAPP will be followed throughout the sampling activities to verify the integrity of the samples from the time of collection until they are submitted to the laboratory for analysis.

Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific health and safety plan prepared by Tetra Tech START. IDW is expected to consist of disposable sampling supplies (gloves, paper towels, polyvinyl chloride liners, pie pans, etc.) that will be disposed of off site as uncontaminated solid waste.

### **Quality Control Samples**

An off-site location will be selected for collecting background samples of soil, groundwater, surface water, and surface water and sediment. To evaluate sample quality control (QC), a field blank will be collected, as specified in Section 2.5 of the QAPP form.

### **ANALYTICAL METHODS**

All samples will be submitted to the EPA Region 7 laboratory in Kansas City, Kansas, for analysis. The water samples will be analyzed for arsenic and lead. All samples will be analyzed according to SOP and methods referenced on the QAPP form. Standard detection limits for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help verify that representative analytical results are obtained. An Analytical Services Request form has been completed by the Tetra Tech START Project Manager and submitted to the EPA Region 7 laboratory. Submittal of samples to the laboratory is expected in March 2007.

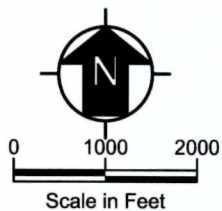
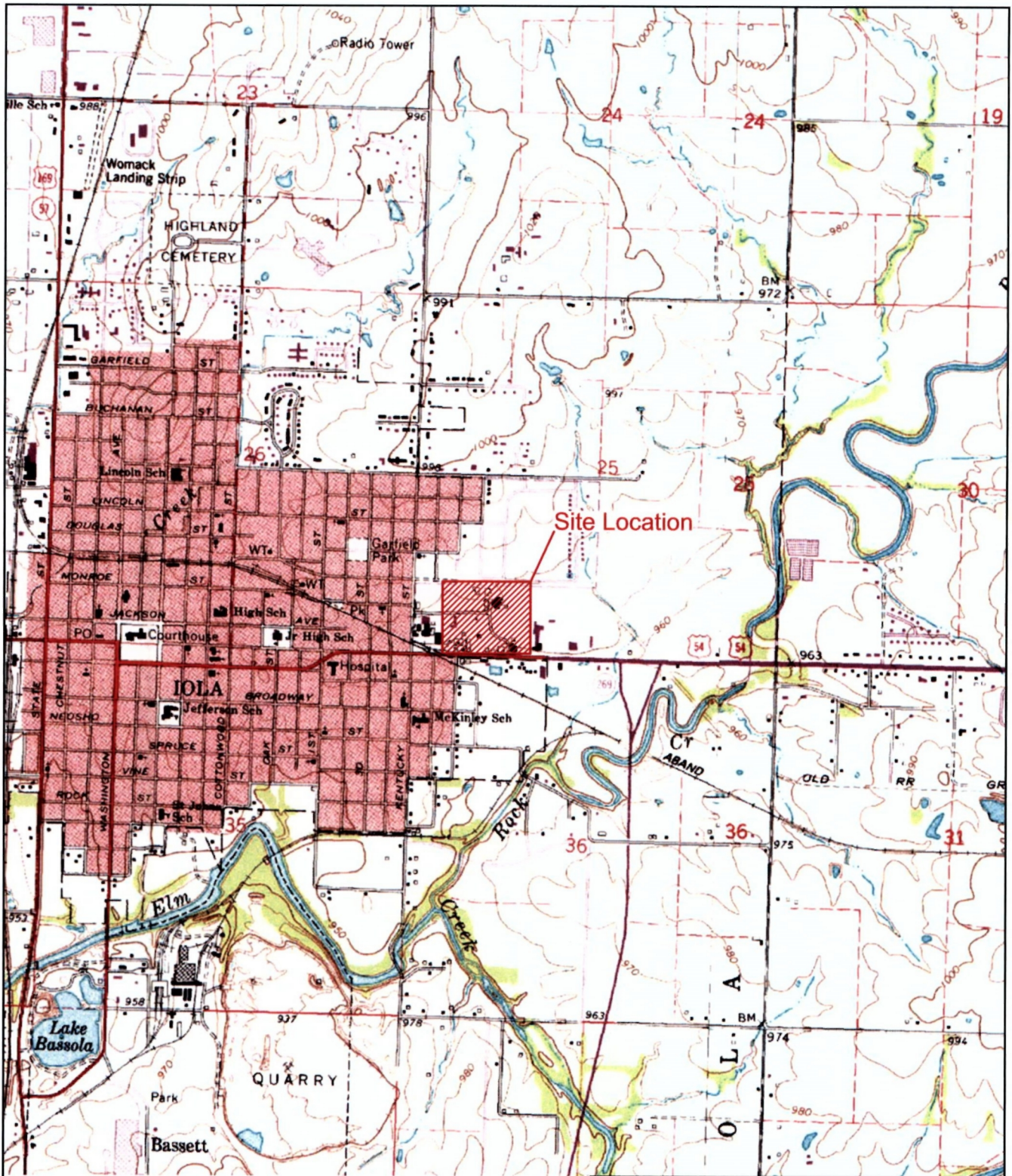
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## **APPENDIX A**

### **FIGURES**



United Zinc Lead Site  
Iola, Kansas

**Figure 1**  
Facility Location Map

 **Tetra Tech EM Inc.**

Date: 01/17/07

Drawn By: Bill Spiking

Project No: 19004.L06.0038.000





- Legend**
- Schools
  - Slag Pile
  - Highway
  - Major Road
  - Local Road
  - Minor Road
  - Other Road
  - Property Boundary

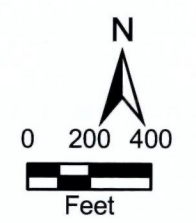
**County Locator**



**Site Locator**

**Allen County**

**Site Location**



Source: Allen Co., Kansas DOQQ Tileset, 2003  
 Street Maps USA-ESRI Media Kit, 2001-2005  
 MAXIM Technologies Inc. Figure 2 (Group B Lead Smelters), 2003

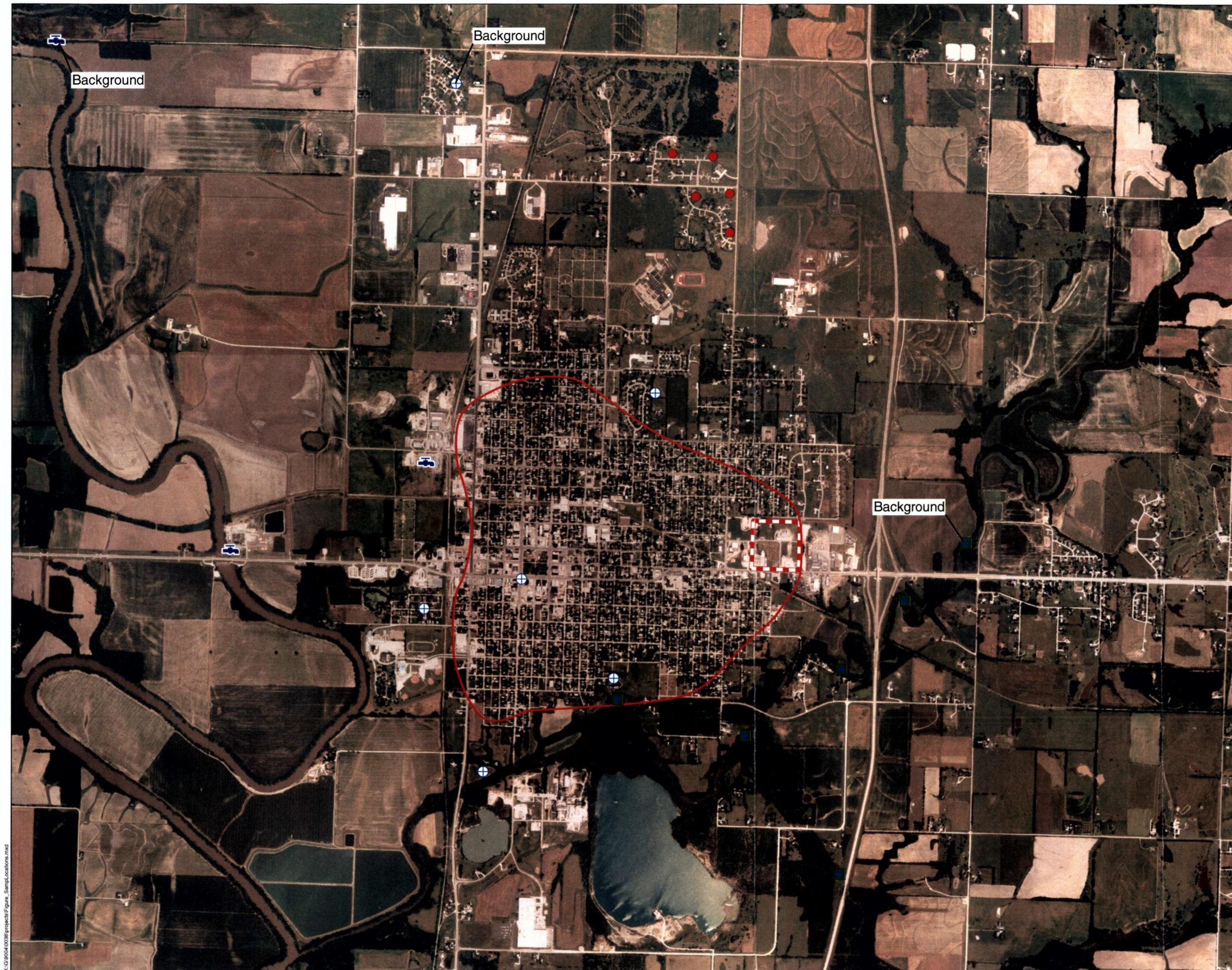
**United Zinc Lead Site**  
 Lola, Kansas

**Figure 2**  
**Facility Map**

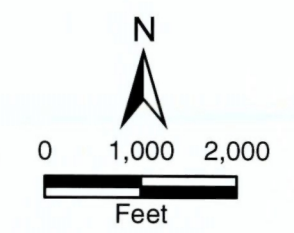
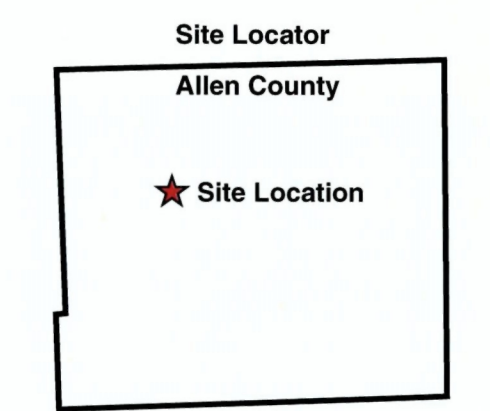


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- Legend
- ⊕ Domestic well sample location
  - Background soil sample location
  - Surface water and sediment sample location
  - 🚚 Public water supply site
  - ▭ Contaminated soil boundary
  - ▭ Property Boundary



Source: Allen Co., Kansas DOQQ Tileset, 2003  
Street Maps USA-ESRI Media Kit, 2001-2005  
MAXIM Technologies Inc. Figure 2 (Group B Lead Smelters), 2003

United Zinc Lead Site  
Iola, Kansas

**Figure 3**  
Proposed Sample Location Map



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